

tionship of *Clepsydropsis antiqua* (a fern-like petiole) to *Cladoxylon* and has outlined a phyletic series connecting the Cladoxyleae with the Zygopterideae. The most important of these intermediates is *Asteropteris noveboracensis* Dawson. This note is scarcely the place for a discussion of these views, so it must suffice for the present to say that the evidence is quite suggestive although not conclusive.

This single specimen of *Cladoxylon dawsoni* is from the Genundewa limestone member of the Upper Devonian Genesee shale in the vicinity of Canandaigua Lake in western New York. At Saalfeld, Thuringia, the several species of *Cladoxylon* occur in strata regarded as Upper Devonian (*Cypridina* shales) in age.

ENTOMOLOGY.—*Some new Gyponas with notes on others.*<sup>1</sup> E. D. BALL, University of Arizona.

The writer made a preliminary revision of this group in 1920<sup>2</sup> with keys to the subgenera and species. With several years of additional biological work on the Eastern and Florida forms, Ball and Reeves<sup>3</sup> made still further revisions and gave the food plants and distribution as far as then known. Since coming to Arizona, the writer has continued the food plant studies and made further collections. These have so increased the number of species in one group that a new key is necessary.

KEY TO THE GENUS GYPONANA BALL (IN THE U. S.)

- A Margin of vertex produced and foliaceous throughout.
- B No black spots on pronotum or hinge. Reticulations absent on basal part of elytra or, if present, no white flecks between.
- C Species large, broad bilineate. . . . . 1-*octolineata* Say
- CC Species smaller, narrow, pale. . . . . 2-*tenella* Sign
- BB A pair of black spots on pronotum and another pair on the hinge (sometimes wanting), elytra densely reticulate (rugose) with white flecks between.
- D Head almost as wide as pronotum, the vertex broad and rounding, species large, with long rounding elytra.
- E Species without a black line under vertex.
- F Vertex slightly produced beyond the eyes then rounding, female segment with a rectangular median notch. (S.E.), 3-*rugosa* Sign
- FF Vertex rounding from the eyes, female segment with two oblique upturned thumb-like projections. . . . . (Ariz.), 4-*ampliata* Ball

<sup>1</sup> Received August 14, 1935.  
<sup>2</sup> *Annals Ent. Soc. Amer.* 13: 83-100. 1920.  
<sup>3</sup> *Annals Ent. Soc. Amer.* 20: 488-500, 2 pl. 1927.

- EE A black line under vertex margin, appendix broadly smoky and the male pygofers scarlet. . . . . (Ariz.), *5-pullata* Ball
- DD Head definitely narrower than pronotum, which narrows anteriorly, vertex more or less angled.
- G Vertex obtusely angled or almost rounding.
- H Vertex very obtusely angled, species tawny green. . . . . (Ariz.), *6-ramosa* Kirk
- HH Vertex almost a right angle, species pale. . . . . (Ariz. & Utah), *7-turbinella* Ball
- GG Vertex right angled or acutely angled, species powdered. . . . . (Utah), *8-chadana* Ball
- AA Margin of vertex and front angled, but not foliaceous.
- I Small species (about 2 mm. wide), vertex about twice as wide as long.
- J Extremely elongate with two oblique stripes on each elytron. . . . . (Calif.), *9-elongata* Ball
- JJ Normal shape and without stripes. . . (Ariz. N. Mex.), *10-delta* Ball
- II Large species (about 4 mm. wide) vertex three times as wide as long. . . . . (S.W.), *11-dorsalis* Sign
- Gyponana rugosa* Spang. This eastern species has not appeared in Arizona except in the higher mountain regions of the N. E. portions, which is the region of the deciduous oaks.

#### *Gyponana ampliata* Ball n. sp.

Big broad tawny-green, heavily reticulate with milky spots and the usual black dots on pronotum and hinge, closely resembling *rugosa*, paler, with the vertex rounding from the eyes, instead of produced and then rounding. Length ♀ 10 mm., width 3.5 mm.

Head practically as wide as pronotum, vertex shorter than pronotum, rounding directly from eyes, elytra broad, densely and evenly reticulate with apices rounding and appendix narrow. Female segment with the customary median quadrangular notch almost obliterated by the semicircular emargination of the lateral portions of the segment leaving oblique, thumb-like projections, which would form the margin of the notch if they were not turned up at right angles against the pygofers. The median portion broadly, shallowly bilobed. Male plates very narrow and widely separated at base, the inner margins broadly expanded, then narrowing to the rounding apices, beyond which the dark, spine-like styles project. In *rugosa* the plates are approximately parallel margined, 3 times as long as wide, and cover the styles.

Holotype<sup>4</sup> ♀ and 2 paratypes Santa Rita Mountains, July 6, 1933, allotype ♂ Chiricahua Mountains July 5, 1930, four paratypes Huachuca Mountains, June 15, 1930, and one Santa Rita Mountains, June 20, 1929, (labeled Tucson). All taken from oak in the high mountains of Southern Arizona by the author, most of them from the silver leaf oak (*Q. hypoleuca*). This species can be recognized by the very distinct genitalia of either sex.

<sup>4</sup> All types are in the author's collection.

**Gyponana pullata** Ball n. sp.

Resembling *ampliata*, but much narrower and more nearly parallel margined. Darker with a black line under the vertex and a broad, smoky appendix. Length ♀ 9 mm., width scarcely 3 mm.

Slender, parallel margined. Head as wide as pronotum, vertex as long as *ampliata*, but narrower so that it is more acutely rounding. Elytron long and narrow with rounding apex and a broad, smoky appendix. Female segment with a broad notch occupying nearly one-half the segment, the margin of the notch rounding back to the lateral angles, base of notch nearly filled by a broad bilobed pyramid that extends nearly as far as the segment. Male plates  $2\frac{1}{2}$  times as long as their individual width, each one convex below and angularly pointed, much exceeded by the long slender slightly knobbed styles. Pygofers and margins of abdomen scarlet.

Holotype ♀ and allotype ♂ Santa Rita Mountains July 6, 1933, nine paratypes taken with the types and in the Chiricahua and Huachuca Mountains, all taken by the author from the silver leaf oak in the mountains of southeastern Arizona.

This is the species Gibson keys out as *ramosa* Kirk, but cannot be the one Kirkaldy had in hand, as he does not mention the black line on vertex and states definitely that it had no appendix while this one has a broad appendix. This species does not occur at Nogales which is below the range of the silver leaf oak. The black line on vertex, smoky appendix, and red pygofers in the male, as well as the distinct genitalia, will easily separate this species. It rather strikingly, but superficially resembles the green males of *Gypona verticalis* in color and shape, but the reticulate elytra places it in a different group.

*Gypona ramosa* Kirkaldy. A narrow-headed species with a slightly angular vertex, but little over half as long as its basal width, a very narrow appendix and often showing a dark line around the apex of each elytron. They are pale green, without the tawny reflection, and heavily white flecked. A few of them show traces of a sinuate dark band on pronotum but this character is not constant in any known species. The female segment has the median third deeply roundly emarginate, with a bilobed tooth two-thirds the length of the notch.

Through the kindness of Mr. E. P. Van Duzee, we have examined the Gyponas of the Koebele collection from which Kirkaldy described this species. There were ten examples of a single reticulate-veined species. This proved to be the common form found on the two oaks (*Q. emoryi* and *oblongifolia*) that grow in the Nogales region. This species answers Kirkaldy's description in every particular and as suggested previously, the slightly angulate vertex, lack of appendix and deeply bisinuate female segment definitely eliminates the species described above as *pullata* on which Gibson placed the name.

**Gyponana turbinella** Ball n. sp.

Resembles *chadana*, larger, broader, with a broader vertex, slightly smaller than *ramosa* with a much longer and more strongly angled head. Pale green,

with white fleckings and a very slightly obtusely angled vertex. Length ♀ 8 mm., width 3 mm.

Head almost as long as the width between the eyes, narrower than the base of pronotum, vertex slightly shorter than pronotum, slightly obtusely angled, instead of acutely angled as in *chadana*. Elytra broad, rounding posteriorly, instead of narrower and almost acutely angled, as in *chadana*. Female segment with a narrow shallow notch with sloping margins, the median feebly bilobed projection about as long as segment. Male plates long, silky, gradually narrowing to rounding apices that exceed the slender pale styles.

Holotype ♀, allotype ♂ October 6, 1929 and six paratypes of various dates, Granite Dell, two from Yarnell Heights, and four from Superior, August 1, 1929. All taken by the author from the Chaparal oak (*Q. turbinella*) in the mountains of Arizona. This is the common species in the Chaparal region from Globe to Williams, Arizona, and appears again around St. George in Utah. The long, definitely triangular head will separate it from all but *chadana*, in which the head is still more pointed and the whole insect is covered with a whitish bloom.

#### *Gyponana elongata* Ball n. sp.

Still longer and narrower than *tenella*, with a head as wide as the pronotum. Pale green with four black stripes on the elytra. Length ♀ 7.5 mm. width 1.8 mm.

Head much wider than in *tenella*, as wide as the pronotum, eyes small, vertex broad, the anterior margin paraboloid or a trifle angled, the margin rather thick and short, scarcely foliaceous. Pronotum, with the lateral margins long and almost parallel, scarcely longer than the vertex. Elytra very long and slender, tapering toward the rounded apices—a few coarse, tawny reticulations scattered along posterior half of corium. Female segment scarcely longer than the adjoining one, broadly roundly or slightly angularly emarginate, the lateral angles acute. Sometimes a median projection is faintly indicated. Male plates extremely long and slender, slightly tapering.

Color: Pale creamy, with a greenish tinge, ocelli red, a pair of widely separated dark dashes on the scutellum. A black stripe just outside the claval suture and another outside the inner fork of the outer sector. A smoky line around the apex. Below pale creamy.

Holotype ♀, allotype ♂, and eleven paratypes taken by the writer from Red Shanks (*Adenostoma sparsifolium*) at Pine Valley, California, July 6, 1931. Strikingly distinct on account of the black stripes.

#### *Gyponana delta* Ball n. sp.

Resembling *tenella*, but paler with a more angular head and a "U" shaped notch in the female segment. Extremely pale green fading to creamy translucent. Length ♀ 8 mm., width 2.5 mm.

Head definitely narrower than pronotum, the vertex roundly angled with the apex bluntly rounding, the margin thick and not foliaceous. Vertex quite variable in length, varying from scarcely 2/3 to nearly the length of pronotum. Elytra about as in *tenella*, with very little reticulation. Female segment rather long with the lateral margins narrowing, the lateral angles rounding, posterior margin elevated over the ovipositor with a deep "U" shaped or slightly angular notch extending nearly half way to the base.

Male plates long, slender, tapering, exceeding the pygofers, but exceeded by the sickle like white styles. The inner margins of the plates are thickened and reflexed and there is a row of long white spines towards the tip.

Holotype ♀, allotype ♂, and 7 paratypes taken on snake weed (*Gutierrezia sarothrae*) at Paradise, Arizona. Six paratypes taken on *Mortonia scabrella* at Tombstone, Arizona, June 13, 1932, all taken by the author. In the angulate head this species resembles *Gypona angulata*, but that is a larger species with simple segment and no reticulations.

***Gyponana delta* var. *alomogorda* Ball n. var.**

Form and structure of the species, but nymphs and adults powdery white, the darker hind wings slightly showing through the elytra.

Holotype ♀, allotype ♂, and seven paratypes taken by the writer May 5, 1933, on a powdery white mint (*Paliomintha incana*) growing on the white sands at Alomogorda, New Mexico.

*Gypona villior* Fowler is closely related to *verticalis* and like that species has males ranging from green all the way to black. The extremely large and prominent veins of the elytra are its most distinctive character. Nymphs and adults have been taken by the writer on the Apache plume (*Fallugia paradoxa*) from Prescott to the Huachuca and Chiricahua Mountains in Arizona.

*Gypona melanota* Spangberg. The study of a larger amount of western material in *unicolor* indicates that the broad, short eastern species is distinct from the longer Rocky Mountain one. *G. melanota* described from black males from New Jersey and Georgia is apparently the oldest name available for the eastern species.

*Prairiana orizaba* Ball and Reeves. This extremely long, slender Mexican species with the acute vertex has been taken by the writer (males only) from Brownsville, Texas; Granite Dell, and Santa Rita Mountains, Arizona.

*Prairiana moneta* Van Duzee. The writer has taken this California species with its broad foliaceous head and smoky male, at Bunkerville, Nevada; Yuma and Phoenix, Arizona. They have all been swept from Bermuda grass in low, damp, alkaline areas and at low elevations.

***Prairiana sidana* Ball n. sp.**

Smaller and narrower than *moneta* Van Duzee with a more acute, but less foliaceous head. Dead grass color in the female with the posterior margin of pronotum and all back of that smoky to shining black in the male. Length ♀ 7 mm, width 2.8 mm; male smaller.

Head slightly narrower than pronotum, the marginal line of pronotum and vertex continuous. Vertex nearly paraboloid, slightly acutely angulate in male, as long as pronotum, much longer proportionally to its width than in *moneta*. Front more inflated than in *moneta*, the vertex margin only slightly foliaceous across front. Elytra short, rather broad in female, nearly parallel margined in the male, exceeding abdomen by less than the apical cells. Female segment bisinuate, the median lobe much smaller than in *moneta*. Male plates long, strap shaped, their points divergent, much longer than the dark spine-like styles. Pygofers angled, but not as acutely as in *moneta*.

Holotype ♀, allotype ♂, and 8 paratypes taken by the writer from a prostrate mat-like mallow (*Sida diffusa*) growing under the short grasses on the range slopes of the Baboquiviri Mountains, Arizona, August 29, 1931, and four paratypes taken under similar circumstances at Patagonia, Arizona, September 20, 1930.

There is no question but what the coloration of this and the other species of *Prairiana* is an adaptation to concealment in dead grass, but the food plant of this species is definitely the mallow creeping below the grass. Most of the species of this genus are more restricted than grass inhabitants usually are and it will probably be found that that restriction is due to food plants growing beneath the grass cover. In the case of *subta* both larvae and adults were found beneath a clump of grass on the plains of Colorado, but there was a mallow (*Malvastrum*) scattered all through the area.

*Ponana sonora* Ball n. sp.

Resembling a small pale *citrina*, straw-colored with a very narrow angulate head and six black spots in a semicircle. Length ♀ 8 mm, width 2.2 mm.

Head extremely narrow, scarcely wider than scutellum; vertex sloping, obtusely angled, one-half wider than long, the anterior margin rounding over to front, much broader than in *citrina*. Ocelli very large, scarcely their own width from the front margin of vertex and midway between the eye and the median line. The front inflated, strongly convex in both diameters; pronotum half longer than the vertex, broad behind, the lateral margins narrowing so rapidly as to form a semicircle with the front margin. Elytra more nearly parallel margined than in *citrina*. Female segment feebly bisinuate; male plates elongated spoon-shaped emarginate near the apex, concealing pale, slender styles with out-turned sickle-like tips.

Color: pale creamy or greenish straw. The ocelli very large and dark red, pronotum with four black spots on the submargin, which, with those on the hinges, form a semicircle. In the darkest specimens the disc of the pronotum is covered with minute dark points. Elytra uniform subhyaline straw with a smoky spot beyond the apex of clavus. Occasionally the eight points appear on the elytra as in *citrina*.

Holotype ♀ and allotype ♂ Santa Catalina Mountains, Arizona, September 19, 1930, and 9 paratypes taken at the same place at various dates from April on. The writer took these, with their white-haired nymphs, from a white-leaved perennial mallow (*Abutilon incanum*) growing on the south slopes of Sabino Canyon.

*Ponana dohrni* Signoret. The writer has taken nymphs and adults of this species from the white sandbar-willow (*Salix exigua*) in a number of places in southern Arizona. They are especially common on second growth sprouts.

*Ponana candida* Van Duzee, described from the Gulf of California, has been taken by the writer at the High Tanks on the Mexican border in Arizona. This beautiful black and white species was found as large nymphs and adults May 17, 1936, feeding on a six-foot white mallow (*Horsfordia alata*).

*Ponana curiata* Gib. The writer took a number of adults of this species

from a woody mat-like composite at the control station on the way up to Mt. Lemmon, Arizona, August 15, 1931. He took a pair at Redondo Beach, California, July 4, 1931, on a hairy, aster-like plant, (*Heterotheca grandiflora*).

*Ponana marginifrons* Fowler. This long, strikingly marked species with heavily margined nervures has been taken in abundance, both nymphs and adults, from the three-leaved sumac (*Rhus trilobata*). It is found in S. W. Colorado, S. E. Utah, Arizona and New Mexico, south into Mexico.

**Ponana marginifrons var. suilla** Ball n. var.

Head form and genitalia of *marginifrons* nearly. Size, shape of body and short elytra of *resima* Fowler. Uniform pale cinnamon with powdered elytra and greenish costa. Length ♀ 8 mm, width 3 mm.

Head about as in *marginifrons*, the vertex less sloping, slightly more angulate with the margin upturned like a hog's snout. Elytra much shorter and broader than in *marginifrons*, about as in *resima*, but without the prominent nervures of either. Females segment of an entirely different pattern from that of *resima*, but resembling *marginifrons* in the acute lateral angles, and the angularly produced median portion with a heavily chitinized projection at the apex.

Color: strikingly distinctive, uniform pale cinnamon. The elytra pruinose with the basal half of the costa greenish, the nervures concolorous. There are no spots or markings, except sometimes the round black dots back of the eyes and dash on hinge that are typical of the group.

Holotype ♀, and one paratype female from the Pinal Mountains above Superior, Arizona, August 1, 1929. Allotype ♂ and two paratype females from the same place July 11, 1935. All beaten from Chaparal Oak (*Q. turbinella*) by the writer.

In appearance this form is quite distinct and resembles *resima*, but in structure, except for wing length, it is close to *marginifrons* and will probably be found to be an adaptation to its food plant.

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PROCEEDINGS OF THE ACADEMY AND  
AFFILIATED SOCIETIES

GEOLOGICAL SOCIETY

522ND MEETING

The 522nd meeting of the Society was held in the Assembly Hall of the Cosmos Club, January 9, 1935, President W. T. SCHALLER presiding.

*Informal communications.*—JEWEL J. GLASS described what is probably the largest known zinnwaldite (a rare variety of mica) crystal, the portion recovered alone weighing 24 pounds. It was found at the Morefield mine in the celebrated pegmatite region near Amelia Court House, Virginia. This mine has also produced germanium-bearing topaz crystals of unusual size, some weighing as much as 500 pounds.

GEORGE OTIS SMITH described crack systems in river ice in Maine due